HOT BEVERAGE MAKER WITH CUP-ACTUATED, LOW-DRIP DISPENSER

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This application is a continuation-in-part of U.S. Application Serial No. 10/403,438, filed March 31, 2003; which is a continuation of U.S. Application Serial No. 10/011,759, filed December 11, 2001. This application claims the benefit of U.S. Provisional Application Serial No. 60/439,100, filed January 10, 2003. Each of these applications is incorporated by reference herein.

This invention relates to a convenient hot beverage maker having a cup-actuated dispenser thereby allowing a user to dispense any amount of beverage desired. The dispenser further includes a low-drip, actuator mechanism that reduces or prevents excess drippage of brewed beverage after the dispenser shut-off valve shuts off flow from a reservoir.

Background of the Invention

Many types and styles of hot beverage makers, especially coffee makers, are known and have been sold for many years. The standard components in these coffee makers include a stand or tower that has a warming plate on the bottom and a filter basket at the top. The coffee maker further includes a carafe that rests on the warming plate and below the filter basket in order to receive brewed liquid from the filter basket.

A problem with traditional coffee makers is the mess that results from using the coffee maker. A user must clean both the carafe and filter basket after each use. Further, if there is no automatic pause and serve feature, then a user must wait for an entire batch to run before removing the carafe to pour a cup of coffee. Even after the batch is run, there may be additional drips that would spill onto the hot warming plate once a carafe is removed for pouring. Also, if a carafe is not properly aligned under a filter basket, it could cause spillage and waste as the hot coffee does not completely flow from the filter basket and into the carafe. Inevitably, a warming plate becomes dirty with overflow or excess dripage, thereby causing an unappealing aroma.

Also, the use of a carafe is an extra step in the coffee making process. It is another component to place in a dishwasher or fill storage space. While a carafe is likely desirable if a user is pouring numerous cups, it typically takes two hands to pour a single cup of coffee - - one hand for the cup and one hand for the carafe. Also, it is possible to cause a splash or spillage simply in the removal or reinserting process of the carafe into and out of the coffee maker stand.

Summary of the Invention

Accordingly, it is an object of the present invention to overcome the foregoing drawbacks and provide a hot beverage maker having a cup-actuated dispenser. This way, a carafe becomes unnecessary. Also, a user can easily

dispense only as much coffee into a cup or mug as the user desires by using a single hand. The clean up process is simplified. All of the potential issues and problems related to using a carafe disappear.

In one embodiment, a hot beverage maker comprises a stand, a fresh water chamber, a brewed beverage tank, and actuator means for dispensing a brewed beverage. The tank comprises a filter basket, a reservoir portion, and an outlet port. The reservoir portion is adapted to hold a brewed liquid, and the outlet port is positioned at substantially the bottom of the reservoir portion. The dispenser actuator means is connected to the outlet port. The actuator means is biased to a closed position but may be moved to an open position by a vessel for holding a hot beverage. Still further, the dispenser actuator means may comprise a push-button positioned in the stand below the brewed beverage tank. Also, there may be a linkage connecting the push-button to the outlet port. In a further alternative, the brewed beverage tank is removable from the stand. Also, the fresh water chamber may comprise transparent walls that allow the user to observe the fresh water level in the chamber. Also, alternatively, the brewed beverage tank may comprise a transparent window to allow a user to observe the brewed beverage level in the tank.

Brief Description of the Drawings

Figure 1 is a perspective view of a preferred embodiment of a coffee maker in accordance with the present invention.

Figure 2 is a perspective view of the coffee maker shown in Figure 1 with the lid in the open position.

Figure 3 is a perspective view of the coffee maker shown in Figures 1 and 2 with the brew tank removed and with the lid in the open position.

Figure 4 is a side elevation, cross sectional view of the coffee maker shown in Figure 1.

Figures 5 and 6 are side elevation cross sectional views detailing the dispenser actuator mechanism in accordance with a preferred embodiment of the present invention.

Figure 7 is a perspective view of another preferred embodiment of a brew tank and filter basket.

Figure 8 is a series of views of a lever mechanism in accordance with an alternative of a dispenser for use with a hot beverage maker as described herein. The views A-F are top plan, front elevation, bottom, top perspective, side elevation, and bottom perspective views respectively.

Figure 9 is a series of views of the same lever arm shown in Figure 8 also including the sealing ring mounted within the plug.

Figure 10 is a pair of diagrams, side elevation and perspective views respectively, of an alternative dispenser actuator mechanism in accordance with the present invention when in the closed position.

Figure 11 are side elevation and perspective views of the same dispenser actuator mechanism shown in Figure 10 except that the mechanism is in the open position.

Detailed Description of the Preferred Embodiments

Figures 1 through 7 illustrate a coffee maker that is a preferred embodiment of the present invention. Naturally, a design engineer having ordinary skill with the assembly of coffee makers will be able to create a coffee maker that incorporates the teachings of the present invention, but which may look different and incorporate different, alternative parts. It is the cup-actuated dispenser that makes the unit very convenient and very different from existing coffee makers that include, for instance, a carafe and other components unnecessary in the present invention.

Turning now to Figure 1, there is shown a coffee maker 10 that is made up of a stand 11, fresh water reservoir 12, brewed beverage tank 13, and a lid 14. The stand 11 forms the base of coffee maker 10 and supports the reservoir 12 and tank 13. The stand 11 includes a recess 20 in which is situated a push-button 21. Adjacent to recess 20 are the electrical switches 22 that

operate the coffee maker 10 and allow the user to, for instance, program a start time or set the time of the clock 23. Of course, these electrical switches 22 may be analog or digital. Fewer or more controls may be applicable for a given model of coffee maker.

The fresh water reservoir 12 has transparent sidewalls 30. The transparent sidewalls 30 allow users to easily and immediately determine whether and how much fresh water is in the coffee maker 10. Of course, nontransparent walls may be used, or a vertical window slot could be used. A water level indicator may also facilitate the ability of a user to accurately gauge the water volume.

The fresh water reservoir 12 rests on the stand 11. The fresh water reservoir 12 wraps partially around the brewed beverage tank 13. The brewed beverage tank 13 also rests on the stand 11. The brewed beverage tank 13 has a transparent window 25 which allows a user to observe very easily and quickly how much brewed beverage is contained within the tank 13. Finally, a lid 14 is rotatably connected to back wall of the reservoir 12. The lid 14 is adapted to cover both the fresh water reservoir 12 and the brewed beverage tank 13.

Figure 2 is similar to Figure 1 except that the lid 14 is rotated up to the open position in Figure 2. With the lid 14 open, there can be seen a removable filter basket 40 that is mountable with the brewed beverage tank 13. The showerhead 35 is connected to the lid 14 and rotates up and down with the lid.

Support arm 36 is a channel connecting the showerhead 35 to the hot water tube shown in Figure 4.

Figure 3 is a still further view of the coffee maker 10 wherein the brewed beverage tank has been removed. The stand 11 includes a platform 50 which is adapted to support the brewed beverage tank shown in the other figures. The apertures 37 on the bottom of the showerhead 35 allow for the even distribution of water into the filter basket when the showerhead/ lid is in the down position. The end of the arm portion 36 of the showerhead 35 includes an aperture 38. When the lid 14 is rotated open, the aperture 38 rotates around and diverts the flow of hot water back into the fresh water reservoir 12.

The platform 50 includes a warmer plate 51 which is adapted to engage the bottom of the brewed beverage tank to keep a brewed beverage inside the tank warm. The platform 50 is molded in part into a recess that is adapted to receive in a mating fashion the molded male portion 110 (see Figure 7) of the bottom of a brew tank. In this mating relationship, the tank is properly aligned and retained in position in the stand 11. Referring briefly back to Figure 2, hooks 42 engage the top of the fresh water tank walls 30 to work with the male portion 110 to properly position the tank 13 on the stand 11. Finally, the platform 50 includes an aperture 53 from which protrudes a lever that makes up part of the dispenser actuator. (See Figures 4-6).

Figure 4 is a cross sectional view of the coffee maker 10 that provides a view of the operational components of the coffee maker. The portions of the coffee maker 10 not previously shown include the water tube 60 which carries heated water from the hot water heater element 61 up to the pipe 62 and then showerhead 35 via the arm 36. The top of the pipe 62 is hingedably connected to the end of the arm 36. The arm 36 includes an aperture 38 which is aligned with an opening to the pipe 62 when the showerhead 35 and lid 14 are in the down position as shown. However, when the showerhead 35/lid 14 are swivelled upwardly, the aperture 38 is rotated around and hot water is rerouted back into the fresh water reservoir 12 to prevent any water flow out of the showerhead when it is in the up position. Although not shown, there is a further tube that is adjacent to the tube 60 that carries the fresh cold water from the fresh water reservoir 12 through the heater coil 61 to the hot water pipe 62 as shown.

The brewed beverage tank 13 is made up of the filter basket 40 that has an aperture 41 at the bottom of the filter basket to allow the infused water to drip into the reservoir portion 45 of the brewed beverage tank 13. An outlet port 70 is the aperture through which the brewed beverage may be allowed to exit the brewed beverage tank 13. The filter basket 40 is conventional in structure and dimension in order to be easily usable. As is also evident from Figure 4, the bottom of the reservoir portion 45 slopes generally from the back

of the coffeemaker(i.e., the fresh water reservoir 12) to the front where the port 70 is fixed. This configuration allows full drainage out of the bottom towards the front of the tank 13 where a user's cup may be easily placed for dispensing.

Turning now to Figures 5 and 6, there is shown one embodiment of a dispenser actuator mechanism in accordance with the present invention. Figures 5 and 6 demonstrate the mechanism in the biased closed position (Figure 5) and in the open position as when a cup 100 is pressing against the push button 21 (Figure 6).

Push button 21 is connected to one end of lever 80. Lever 80 has a pivot point 81 that is a hinge mounted behind the front face 82 of the stand 11. The opposite end 83 of the lever 80 protrudes through aperture 53 (see Figure 3) that makes up a portion of the platform 50 of the stand 11. A second lever 90 is mounted onto the bottom 76 of the brew tank 13. The lever 90 has a first end 91 and a second end 93 that are on opposite ends with a pivot 92 mounted on the bottom portion 76. Further, a spring 95 biases the first end 91 of the lever 90 downwardly so that the second end 93 is biased in a downward position. Plug 94 is adapted to seal the outlet port 70 of the brew tank 13. The plug 94 is connected to second end 93 and is urged upwardly or downwardly based on the movement of the second end 93 of the second lever 90. In the closed position shown in Figure 5, the spring 95 urges the first end 91 downwardly so that the second end 93 is urged downwardly. Accordingly, the

plug 94 is securely sealed to the outlet port 70. Alternatively, as demonstrated in Figure 6, end 83 of the first lever 80 urges the first end 91 of the second lever 90 against the bias of the spring 95. This moves the second end 93 of the second lever 90 upwardly to thereby open the outlet port 70 and allow brewed beverage to flow out of the brew tank 13.

While the "two-piece" actuator illustrated in Figures 4, 5 and 6 is one type of cup-actuated dispensing means, there are, of course, alternative types of dispenser actuators. There are numerous types of electronic dispensers that are well known in the refrigerator door ice and water dispensers. Similarly, other types of mechanical dispensers may be designed to accommodate the specific engineering needs of a given coffee maker structure.

Figure 7 displays further embodiments of the brew tank 113 and filter basket 140. The filter basket 140 is different from the earlier described filter basket 40 in that it includes a handle 141 for making removal very simple. Similarly, the alternative brew tank 113 includes a handle 111 to facilitate handling. The brew tank 113 also has a transparent window 125 allowing a user to observe the brewed beverage volume inside. A spout 112 improves the use of the brew tank as a fresh water bucket to transfer fresh water from a sink or other source and pour it into the fresh water reservoir 12. Finally, lip 114 is merely a design variation of the hooks 140 which allow the brew tank 113 to engage the top of the fresh water reservoir walls 30 to secure the brew tank

113 in place once it is mounted on the platform 50. The male portion 110 is the molded piece of the bottom of the brew tank 113 which is received in the platform 50.

The present development includes a valve that closes the flow from a reservoir wherein the lower end of the valve has a reduced area for coffee or other brewed beverage to drip from. Specifically, the plug portion of the valve arm lever is made in the shape of a geometry that enhances the efficient flow of liquid across the plug body.

Figures 8-11 illustrate an alternative dispenser actuator mechanism having reduced drip properties. Turning first to Figures 8 and 9 and the various views of the lever arm portion of a dispenser actuator mechanism, there is shown the lever arm 150. This lever arm 150 corresponds functionally to the second lever 90 shown in Figures 5 and 6. The lever arm includes a plug 151. The plug 151 is made up of a seal ring 152 that is mounted onto a stem 153. (Alternatively, the seal ring 152 and stem 153 may be a single, integral component.) The seal ring 152 is mounted on the top of the stem 153 in the groove 154 defined by the stem. The bottom of the stem 151 is a cone 155. The cone 155 has an inverted cone shape. In the open position, liquid beverage flows around the plug 151, including across the conical portion 155. The plug 151 is carried on the end of the lever 150 by wing supports 160. The wing supports 160 are very thin so as to constitute little surface area that

liquid may attach to when the liquid is draining through the outlet and across the surface of the plug 150.

Figures 10 and 11 demonstrate a complete dispenser actuator mechanism in operation. In Figure 10, the push button 170 is in its outwardly, biased position as a result of the spring 171. In this position, the second lever arm component 150 is biased in its closed position where the sealing ring 152 closes the outlet port 180. The second lever 150 is biased in this closed position by spring 185. As shown in Figure 11, when the button 170 is pushed inwardly, the end of the first lever 172 pushes against the second lever 150 and moves the plug 152 upwardly. In this way, liquid flows around the plug 152 and out of the reservoir.

In terms of physics, the demonstrated plug construction reduces drippage from the reservoir as a result of the inverted conical shape of the cone 155 on the bottom of the stem 153 of the plug 151. This conical shape creates less surface area on which the coffee may stick and then drip from once the valve is closed. Still further, this conical shape increases the laminer flow of the liquid out of the reservoir. The performance of the present construction is enhanced by a relatively stiff spring 170 holding the push button 170 in the closed, biased position. In this way, the first lever 172 does not block or hinder the operation of the bias spring 185 in the second lever 150.

While the invention has been described with reference to specific embodiments thereof, it will be understood that numerous variations, modifications and additional embodiments are possible, and all such variations, modifications, and embodiments are to be regarded as being within the spirit and scope of the invention.